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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,809	02/07/2002	Tinghao F. Wang	10200-16	9444

7590

09/24/2002

BRINKS HOFER GILSON & LIONE
P.O. Box 10395
Chicago, IL 60610

EXAMINER

DEO, DUY VU

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 09/24/2002

3

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/071,809

Applicant(s)

WANG, TINGHAO F.

Examiner

DuyVu n Deo

Art Unit

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— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12, 14, 15 and 21-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14, 15 and 21-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

2. Claim 12 is rejected under 35 U.S.C. 102(b) as being anticipated by Bourassa et al. (US 4,414,057).

Bourassa teaches a method of etching a metal silicon layer in an environment having a concentration of O₂ can be added at about 5 SCCM to increase the etchrate. This concentration would be greater than 25% by V when the Freon gas being used is at 10 SCCM during the metal silicide etch (col. 3, line 22; col. 4, line 6). Since the concentration of O₂ is the same as that of the claim, the metal silicide would be selectively etched with respect to an underlaying polysilicon layer.

3. Claims 1, 4, 6-8, 12, 15, 21, 24, 26 are rejected under 35 U.S.C. 102(e) as being anticipated by Tabara et al. (US 6,150,250).

Tabara describes a method for etching WSi in a Cl₂/O₂ environment having flow rate of 25 sccm for Cl₂ and 11 sccm for O₂ which would provide a O₂ concentration of higher than

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25% by volume (col. 7, line 5-15). Even though he is silent about the ratio etch rate, of the WSi to the poly, of at least 30; however since the etching gas includes the same gas and the same concentration of O₂ as that of the claims, his method would provide claimed the ratio etch rate, of the WSi to the poly, of at least 30.

The source power is 1400W and the radio frequency power (bias power) is 40W (col. 7, line 12-13).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-12, 14, 15, 21, 24, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai (US 5,880,033).

Tsai describes a method of etching metal silicide (WSi) using Cl₂ and O₂. The pressure is ranging from 2-20 mTorr, 4 mTorr is used in the example. The first power is about 200-2000 watts, and second power (bias power) is about 5-500 watts. The Cl₂ flow rate is about 20-800 sccm, and O₂ flow rate is about 1-50 sccm (summery; col. 4, line 14-15; col. 5, line 1-25; col. 7, line 10-25, line 50-col. 8.) Unlike claimed invention, Tsai doesn't describe the claimed O₂ concentration of 25 % V or greater, source power and bias power are approximately 400 and 50 watts respectively, and 45 sccm Cl₂ and 30 sccm O₂. However, he shows a O₂ high flow rate or concentration (concentration of etchant would be proportional to the flow rate), are desirable, an

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increase in O₂ flow rate from 0 to 10 sccm increases the WSi etch rates from 250 nm/min to 350 nm/min; he also teaches the power ratio of the first power to the second power is selected to enhance the ability of the etchant plasma to anisotropically etch the metal silicide layer and the flow rates are dependent upon the size of the process chamber. Therefore, it would have been obvious for one skill in the art through routine experimentation to determine the optimum parameters such as flow rates power level in order to etch WSi with high etch rate and high selectively to the under polysilicon layer, such as 30 or more, with an anticipation of an expected result.

Concerning to claims 10 and 11, the time to completely etch WSi would have been obviously depending on other factors such as WSi thickness and parameters. A 30 seconds time period would be achievable since Tsai's parameters are overlap claimed parameters.

6. Claims 2, 3, 5, 9-11, 14, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tabara as applied to claims 1, 12 and 21 above.

Unlike claimed invention, Tabara doesn't describe the claimed parameters such as source power at 400W, 25-30% volume O₂, 45 sccm Cl₂, 30 sccm O₂, 3mtorr P, and a 30 seconds of etching. However, determining processing parameters from test runs would be obvious to one skilled in the art at the time of the invention, in order to obtain the optimum processing parameters to etch the WSi with a reasonable expectation of success.

7. Claims 22, 23, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai or Tabara as applied to claims 1 and 21 above, and further in view of Langley et al. (Semiconductor International, October 1989).

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Unlike claims 22, 23, and 25, above prior art doesn't describe a breakthrough etch using gas comprising CF₄. Langley teaches method of etching silicide/poly wherein he teaches etching a native oxide on the silicide using a gas comprising CF₄ (pg. 97, 1st col., 2nd paragraph) before etching the silicide. This would reads on claimed breakthrough etch. It would have been obvious at the time of the invention for one skill in the art to modify Tsai or Tabara in light of Langley in order to remove a native oxide on the silicide before etching of the silicide.

Double Patenting

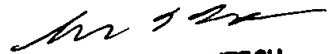
8. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

9. Claims 1-12, 14, 15, 21-27 provisionally rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-12, 14, 15, 21-27 of copending Application No. 09/342,335. This is a provisional double patenting rejection since the conflicting claims have not in fact been patented.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD
September 23, 2002


BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700